BANGALORE ELECTRICITY SUPPLY COMPANY LIMITED

"Selection of Service Provider for Sale of Smart Meters to prospective consumers on rate contract basis in retail outlets for arranging power supply to new connections (including temporary installations) along with Supply, Implementation, Commissioning of IT system for a period of 5 years & Maintenance of IT system for a period of 10 years in BESCOM Jurisdiction." vide Tender Enquiry No. BESCOM/2024-25/SE0193"

ANNEXURE E
NETWORK OPERATION & MONITORING CENTRE SPECIFICATIONS

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Hardware-NOMC Specification, & Connectivity Specifications

1.1. Network Operation & Monitoring Centre (NOMC)

The Network Operations and Monitoring Centre shall caters to the need of the following:

- Project Management Team and the
- Smart Meters network operations team

The designated place for the NOMC shall be provided by the BESCOM and the infrastructure for the NOMC shall be created by the Service Provider with the minimum technical requirements mentioned in clause 1.3 of this annexure.

The SP is required to suggest a suitable architecture for the Network Operation & Monitoring Centre, taking care of the security requirements as described in this document. Service Provider shall establish connectivity between the workstations located at the NOMC with that of the cloud-based MDM-HES system. In addition, the Service Provider shall establish connectivity between the cloud-based MDM system with BESCOM existing Billing system. This will necessitate creation of a VPN tunnel between the two, unless it is decided to migrate the Billing system to the same cloud data center.

The Service Provider must submit the details of the supplied hardware along with the Bid. The Service Provider shall assess the adequacy of hardware as per the requirement of BESCOM & if any additional hardware or higher end hardware configurations are required to meet all the requirements of the Technical Specifications, the same shall be included in the offer.

1.2. General Requirements for NOMC Hardware

All hardware shall be manufactured, fabricated, assembled and finished with workmanship of the highest production quality and shall conform to all applicable quality control standards of the original manufacturer and the SP. All hardware components shall be new and suitable for the purposes specified.

The SP shall ensure that at the time of final approval of hardware configuration and List of Material and Services, all the hardware is as per the current industry standard models and that the equipment manufacturer has not established a date for termination of its production. Any hardware changes, except version upgrade in same series, proposed after contract agreement shall be subject to the following:

a. Such changes/updates shall be proposed, and approval obtained from the BESCOM along with the approval of Drawings/documents.

b. The proposed equipment shall be equivalent or with better features than the equipment included in the Contract.
c. Complete justification along with a comparative statement showing the original and the proposed hardware features/parameters including brochures shall be submitted to the BESCOM for review and approval.
d. Changes/updates proposed will be at no additional cost to the BESCOM.
e. The porting of software shall be at no additional cost in case of replacement of hardware during the contract period.

1.3. Minimum Technical Requirements for NOMC Hardware

1.3.1. Infrastructure Requirements:

The Network Operation and Monitoring Centre shall be equipped with the following minimum hardware components:

a. For initial setup of NOMC, Nine number of minimum 17" Operator workstations (Consoles) including one for Supervisor.
b. For every additional 2lakh consumer, one console shall be added to the existing.
c. A dual redundant 1 Gbps local area network.
d. Internet router with at least 48 no's 1 Gbps LAN ports and redundant at least 2 Gbps internet ports supporting IPsec, and SSLVPN capability
e. Firewall and intrusion protection system
f. One A4 size Laser Printer (Colour)
g. Internet Connectivity

1.3.2. System Software Requirements

This section describes the standards and characteristics of system software such as operating system, database and support software (compilers, DBMS, display development, network utilities, report generation, diagnostics and backup utilities) provided by SP and the original software manufacturer as necessary to support the functioning of Smart Meters Applications systems. All the system software to be used for the present scope of work shall have valid license(s).

1.3.3. Software Standards

All software provided by the SP under the Tender Documents, including the operating system, database and support software, shall comply with the industry-accepted software standards. In areas where these organizations have not yet set standards, the software shall comply with those widely accepted de- facto open standards put forth by industry consortiums, such as Open Software Foundation (OSF) and X/Open. The SP shall commit to meet the "open systems" objective promoted by industry standards groups.

1.4. Design of Smart Meters Applications:

These provisions are applicable for both software applications and operating systems and would address program features that must be contained in software for the product to meet the standards.

a. When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be distinguished textually.
b. A well-defined on-screen indication of the present focus shall be provided that moves among interactive interface elements as the input focus changes.
c. Applications shall not override user selected contrast and colour selections and other individual display attributes.

When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.

1.5 Applications

All components of Smart Meter application system shall be maintainable by Service Provider using the supplied software utilities and documentation. The software design and coding standards of the system shall address the followings:

a. **Expansion**: Software shall be dimensioned to accommodate the size of Smart Meter application system.
b. **Modularity:** Software shall be modular i.e. functionally partitioned into discrete, scalable, reusable modules consisting of isolated self-contained functional elements and designed for ease of change. The system shall make maximum use of common industry standards for interfaces.
c. **User-Directed Termination:** Functions taking long execution times shall recognize and process user requests to abort the processing.
d. **Portability & Interoperability**: The system shall be designed for hardware independence and operation in a network environment that facilitates interoperability and integration of third-party applications. AMI applications should support any of the Relational Database Management Systems (RDBMS). Such AS PostgreSQL/MYSQL/ORACLE/MSSQL.

All applications shall be designed with sufficient background logs which capture various level of errors encountered (warning, fatal, informational) while executing, so that the same can be reviewed and attended to.

a. Operating System

The operating system of all the equipment of Smart Meter application system including network equipment shall be latest version released up to six months prior to FAT. The operating system shall be hardened to provide robust security. The operating system and data file shall be placed in different disk partitions.

In order to facilitate cyber security requirements including patch management, common operating system is preferable to be used by all server nodes within the Smart Meter application including MDM/HES servers. This is also to minimize the maintenance. All licenses for Operating System and other application software shall be supplied by the SP and shall be valid throughout the contract period.

b. Time and Calendar Feature

The Smart Meter application & other servers shall maintain time and calendar for use by various software applications. The internal clocks of all servers and workstation consoles shall be automatically synchronized on Network Time Protocol (NTP) protocol. The calendar shall be customizable for working hours, holidays, weekends etc. The holidays, including type of days, shall be entered for each year at the beginning of the year and shall be recognized by all applications.

c. Remote Diagnostic

Remote Diagnostic facility with necessary hardware as required shall be provided for communication between the Smart Meter application system at the cloud data Centre and the NOMC for the diagnosis of hardware & software problems. The login shall be protected by a username & password entry. An automatic logging and intimation shall be provided to inform authorized person from SP/BESCOM on such events of remote access and diagnosis.

d. Development System as a Test Bench

A Development system independent of the production environment shall be defined at the cloud data centre which shall provide testing facility for integration of changes/modifications of the Smart Meter application and new field devices before putting it online with Real-time system. This Development system shall be on a VLAN separated from the production VLAN and shall be self-sufficient to carryout testing of changes/ modifications.

1.6 Network Communication

The network communications software shall use a standard network protocol such as TCP/IP, UDP etc. and shall support IPv6 or latest version. The software shall

link dissimilar hardware nodes such as local and remote workstations and peripheral devices into a common data communication network allowing communications among these devices. The network communication software shall include network security, security management, patch management and network services of the Smart Meter system. Network communication software shall have scalability feature as envisaged.

Sd/-

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DAS, SG & TIC
BESCOM.

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